

ONTARIO. WATER RESOURCES COMMISSION

Lake Ontario outfall survey township of  
Scarborough.

1964.

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ONTARIO WATER RESOURCES COMMISSION

LAKE ONTARIO OUTFALL SURVEY

Township of Scarborough

1964.



*Step - 1  
Scarborough Ship*

THE  
ONTARIO WATER RESOURCES  
COMMISSION  
  
LAKE ONTARIO OUTFALL SURVEY  
  
TOWNSHIP OF SCARBOROUGH

1964

REPORT ON

TOWNSHIP OF SCARBOROUGH

L A K E O N T A R I O O U T F A L L S U R V E Y

ONTARIO WATER RESOURCES COMMISSION

Division of Sanitary Engineering

October 1964

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## INTRODUCTION

A sampling survey of the outfalls located on the shore of Lake Ontario in the Township of Scarborough was conducted on October 22, 1964. The purpose of the survey was to determine what progress had been made by the township in eliminating sources of pollution indicated in the OWRC report of May 1962.

The following people were interviewed in regard to this survey:

Mr.H.Lightwood, Sewer Maintenance Section Head, Twp.of Scarborough  
Works Department;  
Mr.F.Nonnenkamp, Technical Assistant, Twp.of Scarborough  
Works Department;  
Mr.J.F.Chester, Chief Public Health Inspector,  
Scarborough Health Department;  
Mr.W.Brown, Engineer, Metropolitan Toronto Works Dept.,  
Industrial Waste Control Branch.

The assistance received from the Township of Scarborough in carrying out this survey is appreciated by the OWRC.

## SAMPLING PROCEDURE

"Grab" samples were collected from storm and relief sewers discharging wastes, as well as two local watercourses, Highland Creek, and Lake Ontario. The Ontario Water Resources Commission Laboratory conducted bacteriological examinations and chemical analyses on the samples submitted. The location of the sampling points are shown on the appended map.

The analyses employed in this investigation to assess the quality of the waste and surface waters were as follows:

### Biochemical Oxygen Demand (BOD)

The BOD of sewage, polluted waters, or industrial wastes, is the oxygen required for stabilization (natural purification in a stream) of the decomposable organic matter of chemical material by aerobic biochemical action. Unless otherwise noted, a five-day BOD determination with incubation at 20°C. is reported. A high BOD is indicative of organic or chemical pollution. A desirable upper limit in surface waters commonly is four(4) parts per million.

### Suspended Solids

The results are reported in parts per million and indicate the measure of undissolved solids of organic or inorganic nature. Where suspended solids values, ascertained by a quantitative analyses, approach 20 parts per million or less, laboratory difficulties usually result in these values being determined as turbidity a qualitative analysis, which is reported in turbidity units.

### Phenols

The phenolic compounds, collectively referred to as phenols are those hydroxy derivatives of benzene or its condensed nuclei, which are determined by the Gibbs Method with modifications. The results are reported in parts per billion (ppb). Phenols are present in waste flows from many industrial processes. Dependant on the concentration, the presence of these materials



may be toxic to fish or may taint the flesh of fish. Phenols in very minute concentrations will combine with chlorine to produce intense tastes and odours which are variously described as medicinal, chemical or iodoform.

As an objective, the concentration of phenols should average not more than two(2)ppb and definitely not exceed five (5) ppb at any point in receiving waters subsequent to initial dilution.

#### Membrane Filter Unit

The membrane filter technique is employed to obtain a direct enumeration of coliform organisms and is reported per 100 millilitres. The presence of coliforms indicate pollution from human or animal excrement, or from some non-faecal forms. A membrane filter coliform count in excess of the upper limit of 2,400 organisms is considered to render the water undesirable for bathing purposes.

#### OWRC OBJECTIVES

Adequate protection for these waters, except in certain specific instances influenced by local conditions, should be provided if the following waste discharge concentrations are obtained:

<u>Item</u>	<u>Concentration</u>
5-day BOD	not greater than 15 ppm
Suspended Solids	not greater than 15 ppm
Phenol	not greater than 20 ppb

## SAMPLE RESULTS

The laboratory results of samples collected at the time of inspection and those collected over the past years are shown in the tables appended to this report.

### Storm and Relief Sewer Effluent Samples

Of the fifteen outfalls checked fourteen were observed to be discharging effluents and these were sampled. Three of the laboratory results will be discussed under the appropriate designated sampling point number and location.

- LO-89.3W - 48 inch  $\phi$  storm sewer south end of Fallingbrooke Dr. The chemical analysis indicated a BOD, suspended solids and phenols concentration of 32 ppm, 24 ppm, and 6 ppb, respectively. The bacteriological examination showed the presence of 21,000 coliform organisms. The estimated flow was 10-12 gpm.
- LO-90.4R - 48 inch  $\phi$  relief sewer Birchmount Rd. The chemical analysis showed a BOD, suspended solids, and phenols concentration of 140 ppm, 130 ppm, and 20 ppb, respectively. The bacterial examination revealed a count of 5.5 million coliform organisms. The estimated flow was 3-4 gpm. The strength of the BOD and suspended solids and the coliform content indicate that raw sewage was present. The phenol concentration was equal to the OWRC maximum allowable.
- LO-91.7W - 24 inch  $\phi$  storm sewer Scarboro Crescent. The bacteriological examination showed .49 million coliform organisms present. The chemical analysis indicated BOD, suspended solids and phenols concentrations of 52 ppm, 176 ppm, and 12 ppb, respectively. The approximated flow was .5 to 1 gpm.

The laboratory results of these three samples indicated that the effluents were in excess of the Commission's maximum objectives, in fact the relative strengths of the BOD and suspended solids of sampling point LO-90.4R would suggest the presence of

raw sewage. The source of these polluting waste flows should be located and eliminated.

#### Watercourses

Samples were collected from two local watercourses, Highland Creek and Lake Ontario. The bacteriological examinations and chemical analysis showed the following:

<u>Sampling Point</u>	<u>Location</u>	<u>BOD</u>	<u>S.S.</u>	<u>Coliforms per 100 ml</u>	<u>Approx. Flow- gpm</u>
LO-92.0D	Local watercourse west of Brimley Rd.	840	94	20	10-12
LO-93.9D	Local watercourse east of Pineridge Dr.	168	958	1,300,000	1/2-1
LO-98.6D	Highland Creek at Lake Ontario	16	28	0	
LO-98.6	Lake Ontario just opposite the mouth of Highland Creek	18	77	0	

Sampling point LO-92.0D indicates that this watercourse receives polluting wastes probably in the form of leachate from the Brimley Road sanitary landfill operation. The stream traverses this area before discharging to Lake Ontario. The phenol concentration was 200 ppb which greatly exceeds the OWRC maximum objective of not greater than 2 ppb for surface waters in the Province of Ontario. Reportedly, the Township of Scarborough intends to intercept this watercourse above the landfill site and re-route it to a storm sewer for discharge to Lake Ontario. In addition, leachate from this site will be collected and pumped to

the sanitary sewer for treatment at the water pollution control plant. This action should be implemented with haste in order to correct this undesirable condition.

Sampling point LO-93.9D is at a small watercourse located just east of Pineridge Drive traversing a number of private properties and draining via a ravine to Lake Ontario. The excessive BOD would suggest the presence of raw sewage while the high suspended solids could be attributed to organic waste and eroded material from the creek bed. It was reported that the homes in this area are serviced by septic tank and sub-surface tile field installations. These systems should be checked to determine if there are malfunctioning sewage disposal systems discharging wastes to this stream.

Sampling point LO-98.6D is at Highland Creek just before discharge to Lake Ontario. The BOD of 16 ppm and phenol concentration of 12 ppb were in excess of the OWRC maximum objectives. The Highland Creek sewage treatment plant discharges its effluent to this stream just upstream from the point at which this sample was obtained. This plant is an activated sludge plant with a flow capacity of 10 mgd. A water quality survey of Highland Creek has been made by the OWRC and a separate report on this watershed is being prepared.

Sampling point LO-98.6 - This sample was collected from Lake Ontario just opposite the mouth of Highland Creek.

The BOD and phenol concentrations of 18 ppm and 18 ppb, respectively, would indicate that the water quality in this area of Lake Ontario is being adversely affected by the water from Highland Creek.

### Industrial

Johns-Manville Company Limited industrial sewer outlet to Lake Ontario was sampled and the chemical analysis indicated that the BOD and suspended solids were in excess of the Commission's maximum objective of not greater than 15 ppm for both values. The Metropolitan Toronto Works Department, Industrial Waste Control Branch, and the OWRC's Division of Laboratories, Industrial Waste Branch, are studying the waste treatment problem at this industry.

### SCARBOROUGH HEALTH DEPARTMENT SAMPLES

The Township Health Department collected samples for bacteriological examination from Lake Ontario east of the R.C.Harris water purification plant. A copy of the laboratory results with the approximate locations of the sampling points are appended to this report. Of the twenty-eight samples collected from Lake Ontario at this public beach area only two, or 7 per cent, of the samples indicated that the total coliform organisms present were in excess of the Commission's maximum objective of not greater than 2,400 coliform organisms per 100 ml. However, 12 or 43 per cent of the samples contained Escherichia coli which suggests the presence of sanitary wastes. It is interesting to note that in this area there are three storm sewers discharging

contaminated wastes to Lake Ontario. If this area is to be used as a public bathing place the waste flows from these storm sewers should be eliminated.

#### COMMENTS & CONCLUSIONS

Reportedly, the Township of Scarborough Works Department checks the overflow weirs of sanitary sewers to the storm sewers once a week. When flow conditions are noted and the weir is not built high enough corrective action is taken. The sanitary sewers should be of sufficient size to contain normal dry weather flows from 2.5 to 3.5 DWF. Laboratory tests of samples collected from storm and relief sewers discharging effluents indicate these wastes contain chemical and bacterial material characteristic of sanitary wastes. It is suggested that the cause of the undesirable waste discharges be determined and eliminated.

The laboratory results of the samples collected from surface waters in the township were in all instances but one, unsatisfactory. The BOD of watercourses should not exceed 4 ppm or contain greater than 2 ppb phenols. The two small local watercourses, namely LO-92.0D and LO-93.9D should be inspected to determine the extent of the problem, and then the necessary remedial action should be taken forthwith.

A separate water quality survey has been conducted on Highland Creek and a report will be made on this study at a later date.

RECOMMENDATIONS

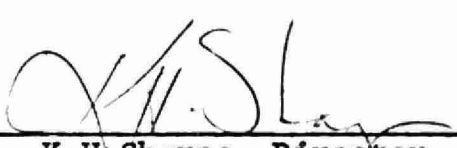
1. The Township of Scarborough should continue to pursue an active programme of pollution abatement to eliminate the discharge of untreated wastes from municipal storm and relief sewers to Lake Ontario.
2. The apparent leachate problem at the Brimley Road sanitary landfill area should be corrected.
3. The cause of the high concentration of BOD in the local watercourse in the Pineridge Drive area should be determined and remedial action taken where necessary.
4. The Johns-Manville Company Limited should obtain further treatment of its industrial wastes discharged to Lake Ontario.

All of which is respectfully submitted,

District Engineer: \_\_\_\_\_

  
H. Browne

Approved by: \_\_\_\_\_

  
K.H. Sharpe, Director

Prepared by: D.A. Murray Wilson

APPENDIX A

ALL ANALYSES EXCEPT PH  
REPORTED IN PPM UNLESS OTHERWISE  
INDICATED.

SAMPLING POINT No.	LOCATION & DESCRIPTION	DATE	5-DAY BOD	TOTAL SOLIDS	SUSPENDED SOLIDS	DISSOLVED SOLIDS	MF COLIFORM COUNT/100 ML	EST. DWF GPM	PHENOLS IN PPB
L0-89.1W	STORM SEWER - FALLINGBROOK RD.	DEC.21/61	132	1170	564	606	660,000		
		AUG.28/62	3.6	656	6	650			4
		SEPT.3/63	1.5	660	10	650	2,330,000		
		OCT.22/64	2.8	956	7	949	49,000	1.0	6
L0-89.3W	48 INCH Ø STORM SEWER SOUTH END OF FALLINGBROOK DR.	NOV.22/61	1.6	568	7.5*	--	590		8
		DEC.21/61	2.4	576	4.0*	--	180		0
		AUG.28/62	1.2	578	10	568	1,050		3
		SEPT.3/63	60	786	133	653	16,000		
		OCT.22/64	32	720	24	696	21,000	12.0	6
L0-89.7R	60 INCH Ø RELIEF SEWER WARDEN AVE.	DEC.21/61	8.6	578	296	282	350		10
		SEPT.3/63	3.4	446	7	439	29,000		
		OCT.22/64	10	356	11	345	56,000	1.5	10
L0-90.4R	48 INCH Ø RELIEF SEWER BIRCHMOUNT RD.	DEC.21/61	1.9	3426	4.0*	--	6,300		0
		SEPT.3/63	42	632	23	609	17,000,000		
		OCT.22/64	140	662	130	532	5,500,000	4.0	20
L0-90.9W	60 INCH Ø STORM SEWER LAKEHURST CRES.	DEC.21/61	24	1806	20*	--	73,000		0
		AUG.28/62	36	816	88	728	42,000,000		0
		SEPT.3/63	12	1062	42	1020	890,000		
		OCT.22/64	5	672	18	652	74,000	1.0	15
L0-91.3W	STORM SEWER- GLEN EVEREST RD.	DEC.21/61	2.1	3600	17 *	--	80		TRACE
		AUG.28/62	2.0	902	8	894	47,000		6
		SEPT.3/63	2.1	272	4	268	0		
		OCT.22/64	5.4	490	24	466	25,000		6
L0-91.6W	48 INCH Ø STORM SEWER MIDLAND AVE.	DEC.21/61	13	4262	360	3902	34,000		8
		AUG.28/62	2.0	402	18	384	13,900		7
		SEPT.3/63	1.9	542	9	533	3,700		
		OCT.22/64	4.5	506	20	486	20,000		15

\* ASTERISK DENOTES WHERE SUSPENDED SOLIDS HAVE BEEN REPORTED AS TURBIDITY AND ARE EXPRESSED AS TURBIDITY UNITS.



ALL ANALYSES EXCEPT PH  
REPORTED IN PPM UNLESS OTHERWISE  
INDICATED.

SAMPLING POINT No.	LOCATION & DESCRIPTION	DATE	5-DAY BOD	TOTAL SOLIDS	SUSPENDED SOLIDS	DISSOLVED SOLIDS	MF COLIFORM COUNT/100 ML	EST. DWF GPM	PHENOLS IN PPB
LO-91.7W	24-INCH $\phi$ STORM SEWER - SCARBORO CRES.	DEC.21/61	315	1020	214	806	1,500,000		60
		AUG.28/62	1.1	1142	11	1131	9,800		7
		SEPT.3/63	1.4	1812	8	1804	5,800		-
		OCT.22/64	52	930	176	754	490,000	.5	12
LO-91.8W	48-INCH $\phi$ STORM SEWER - CHINE DR.	DEC.21/61	7	1390	7.5*	--	15,000		0
		AUG.28/62	2.2	544	10	534	8,200,000		3
		SEPT.3/63	2.7	506	4	502	6,200		
		OCT.22/64	2.9	560	9	551	6,200	1.5	3
LO-92.0D	LOCAL WATERCOURSE WEST OF BRIMLEY RD.	DEC.21/61	2.1	3260	6.5*	--	1,400		2
		AUG.28/62	510	1412	538	874	5,100		250
		SEPT.3/63	400	978	72	906	190		--
		OCT.22/64	840	1420	94	1326	20	12.0	200
LO-92.2W	48-INCH $\phi$ STORM SEWER SOUTH OF LARWOOD BLVD.	DEC.21/61	5	1318	11.5*	--	150,000		0
		AUG.28/62	2.7	1018	13	1005	59,000		3
		SEPT.3/63	145	1152	126	1026	430,000		--
		OCT.22/64	5.1	620	7	613	3,800	5.0	20
LO-93.9D	LOCAL WATERCOURSE EAST OF PINERIDGE DR.	DEC.21/61	9	1200	108	1092	350,000		0
		AUG.28/62	68	1486	376	1110	960,000		13
		SEPT.3/63	1240	13,414	12,198	1216	1,900,000		--
		OCT.22/64	168	1490	958	532	1,300,000	1.0	0
LO-95.2W	72 INCH $\phi$ STORM SEWER FOOT OF LIVINGSTON RD.	DEC.21/61	4	906	17*	--	940		3
		AUG.28/62	6.4	938	196	742	270,000		0
		SEPT.3/63	11	956	133	823	87,000		--
		OCT.22/64	2.3	916	27	889	3,000	30.0	0
LO-95.8 W-1	36 INCH $\phi$ STORM SEWER - EAST OF GALLOWAY RD.	SEPT.14/60	2.6	600	28	572	10		0
		NOV.17/60	2.8	766	86	680	900		--
		DEC.21/61	2.2	700	2.8*	--	78		--
		AUG.29/61	1.2	854	3	851	8,000		4
		OCT.22/64	2.2	622	25	597	900	.5	2

\* ASTERISK DENOTES WHERE SUSPENDED SOLIDS HAVE BEEN REPORTED AS TURBIDITY AND ARE EXPRESSED AS TURBIDITY UNITS.

APPENDIX A

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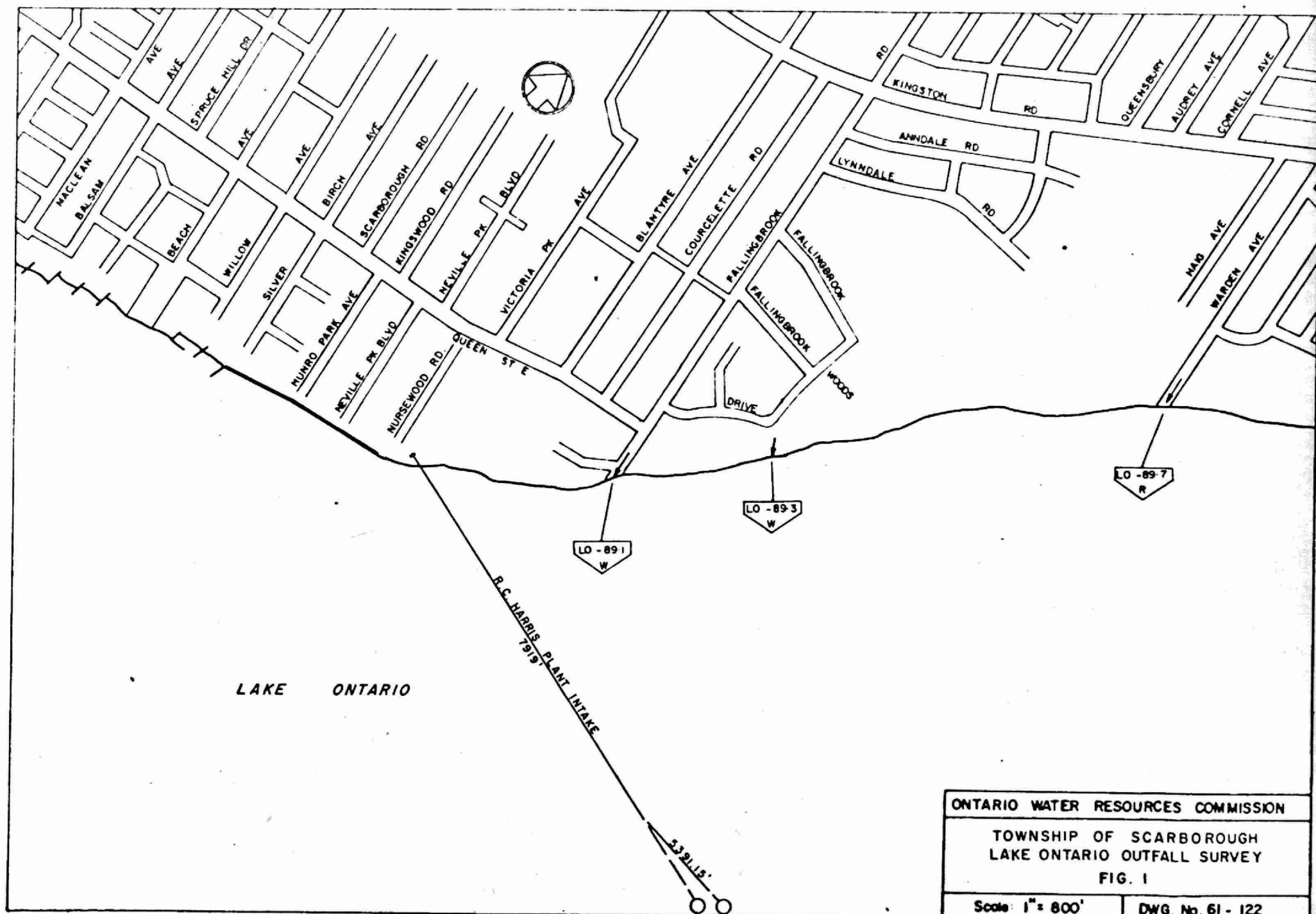
SAMPLING POINT NO.	LOCATION & DESCRIPTION	DATE	5-DAY BOD	TOTAL SOLIDS	SUSPENDED SOLIDS	DISSOLVED SOLIDS	MF COLIFORM COUNT/100 ML	EST.DWF GPM	PHENOLS IN PPB
L0-95.8 W-2	21 INCH $\phi$ STORM SEWER EAST OF GALLOWAY RD.	SEPT.14/60 NOV.17/60 DEC.21/61 OCT.22/64	NO. FLOW NOTED " " " " " " " " "						
L0-95.8 W-3	8-INCH $\phi$ STORM SEWER EAST OF GALLOWAY RD.	SEPT.14/60 NOV.17/60 DEC.21/61 AUG.29/62 SEPT.4/63 OCT.22/64	2.8 6 2.9 1.8 2.4 7.9	560 784 792 812 774 1002	80 24 8.5* 8.0 22 75	480 760 -- 804 752 927	0 10 2 370 38 3,300	.5	3 -- 0 0 -- 0
L0-96.6W	60 INCH $\phi$ STORM SEWER FOOT OF MORNINGSIDE AVE.	DEC.21/61 AUG.29/62 SEPT.3/63 OCT.22/64	3.8 2.8 11 1.9	1528 858 874 9098	4 * 78 27 20	-- 780 847 1078	8,700 82,000 17,900 4,100	240	4 4 -- 4
L0-98.6D	HIGHLAND CREEK AT LAKE ONTARIO	SEPT.14/60 NOV.17/60 MAY 10/61 JULY 26/61 AUG.29/62 SEPT.4/63 OCT.22/64	13 11 15 9 40 0.6 16	474 522 698 584 580 536 612	28 66 16* 15* 62* 68 28	446 456 -- -- -- 468 584	10 980,000 12 2,160,000 23,000,000 60 0		8 28 17 0 25 -- 12
L0-99.1 I	3'-0" x 3'-0" INDUSTRIAL SEWER - JOHNS-MANVILLE CO.LTD.	SEPT.14/60 NOV.17/60 SEPT.12/62 SEPT.4/63 OCT.22/64	34 21 8.0 3.2 19	490 372 1384 412 352	172 164 736 142 85	318 208 648 270 267	4,800 100 3,000 6,000 20,000		6 4 20 -- 0
L0-92.0	LAKE ONTARIO JUST OPPOSITE BRIMLEY RD.	OCT.22/64	3.4	296	72	224	900		0
L0-98.6	LAKE ONTARIO JUST OPPOSITE THE MOUTH OF HIGHLAND CREEK	OCT.22/64	18	612	77	538	0		18

\* ASTERISK DENOTES WHERE SUSPENDED SOLIDS HAVE BEEN REPORTED AS TURBIDITY AND ARE EXPRESSED AS TURBIDITY UNITS.

APPENDIX B

SCARBOROUGH HEALTH DEPARTMENT BACTERIOLOGICAL SAMPLES

SAMPLING POINT No.	LOCATION & DESCRIPTION	DATE	LABORATORY - TORONTO	
			MPN TOTAL COLIFORM ORGANISMS	E. COLI
S-1	100 YARDS EAST OF THE R.C. HARRIS WATER PURIFICATION PLANT	JULY 9/64	43	23
		JULY 15/64	270	210
		JULY 22/64	0	0
		JULY 28/64	2300	230
		AUG. 5/64	150	150
		AUG. 10/64	150	0
		AUG. 18/64	430	0
S-2	200 YARDS EAST OF THE R.C. HARRIS WATER PURIFICATION PLANT	JULY 9/64	43	0
		JULY 15/64	3900	2300
		JULY 22/64	0	0
		JULY 28/64	2300	230
		AUG. 5/64	230	23
		AUG. 10/64	430	0
		AUG. 18/64	930	0
S-3	300 YARDS EAST OF THE R.C. HARRIS WATER PURIFICATION PLANT	JULY 9/64	43	0
		JULY 15/64	930	230
		JULY 22/64	36	0
		JULY 28/64	750	23
		AUG. 5/64	93	23
		AUG. 10/64	430	230
		AUG. 18/64	230	0
S-4	400 YARDS EAST OF THE R.C. HARRIS WATER PURIFICATION PLANT	JULY 9/64	43	9.1
		JULY 15/64	2300	230
		JULY 22/64	3.6	0
		JULY 28/64	150	43
		AUG. 5/64	75	75
		AUG. 10/64	930	230
		AUG. 18/64	230	0



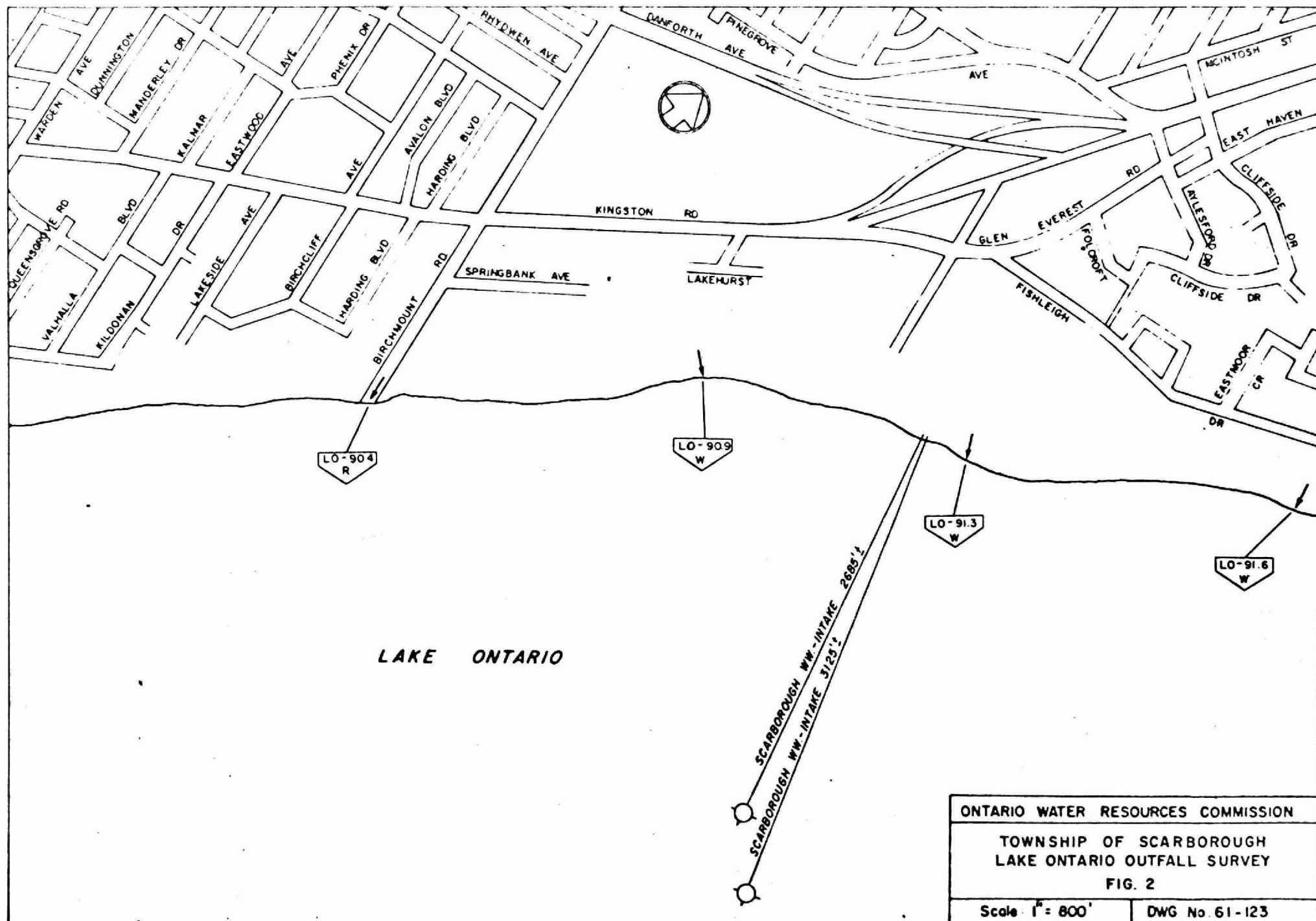
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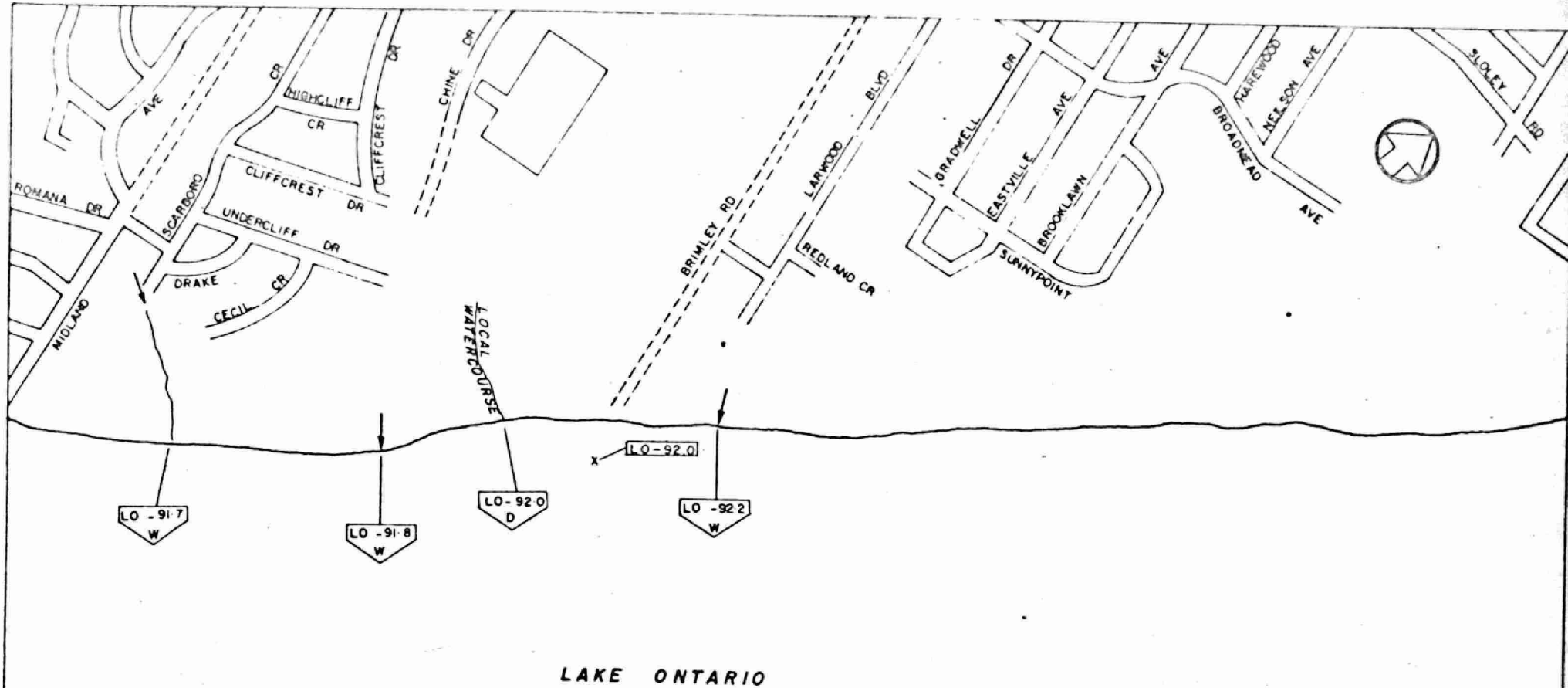
TOWNSHIP OF SCARBOROUGH  
LAKE ONTARIO OUTFALL SURVEY

FIG. 1

Scale: 1" = 800'

DWG. No. 61-122





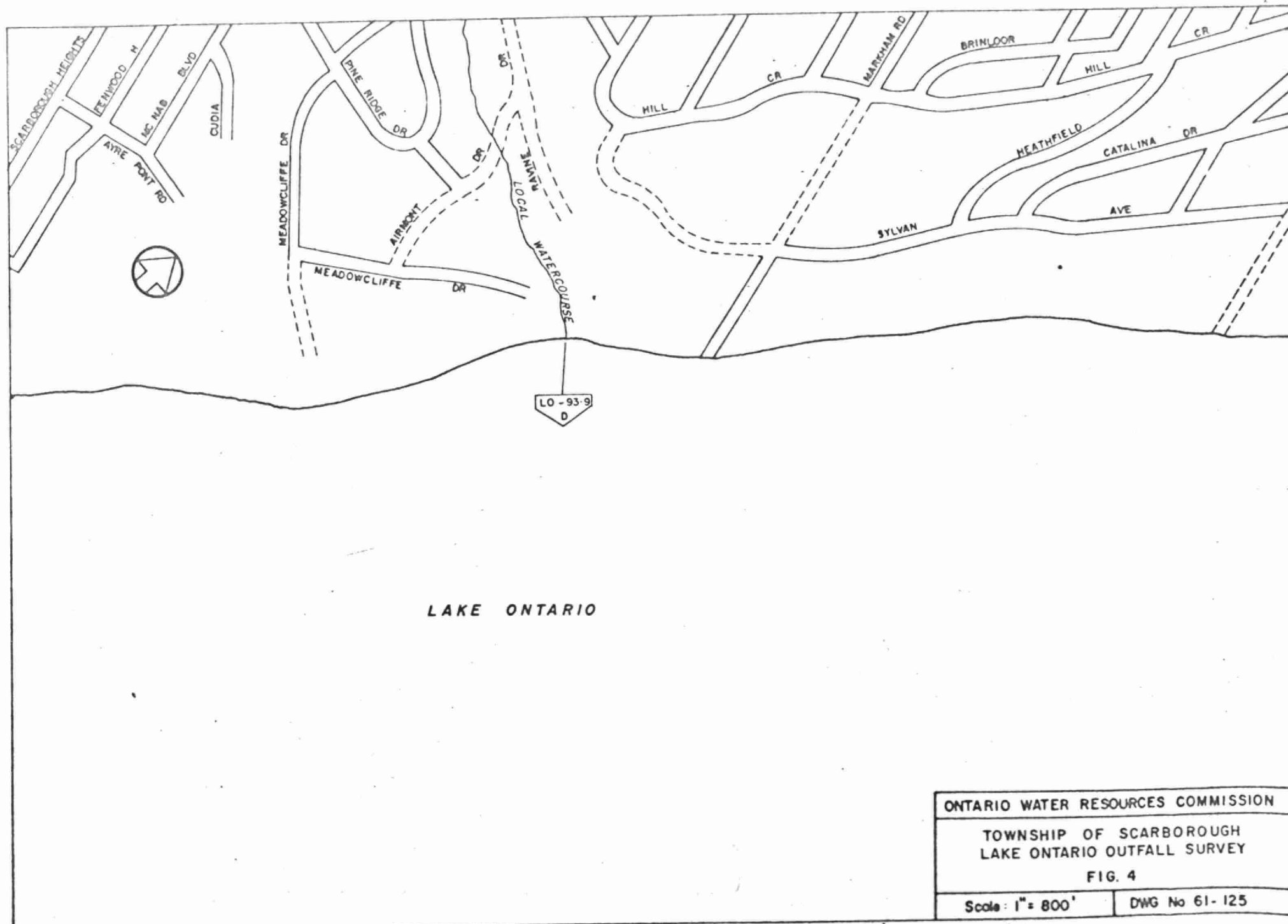
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FIG. 3

Scale: 1" = 800'

DWG. No 61 - 124



LAKE ONTARIO

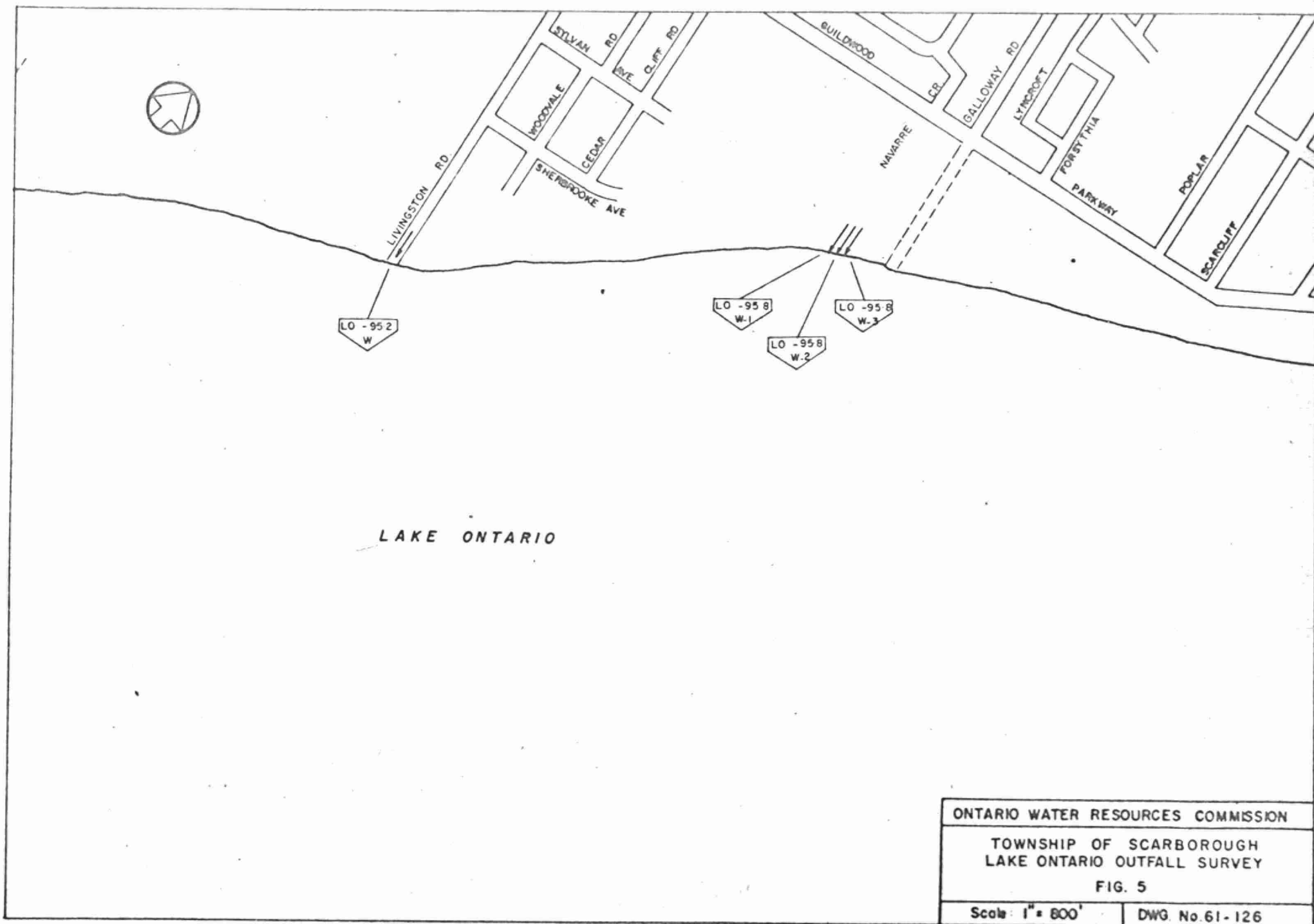
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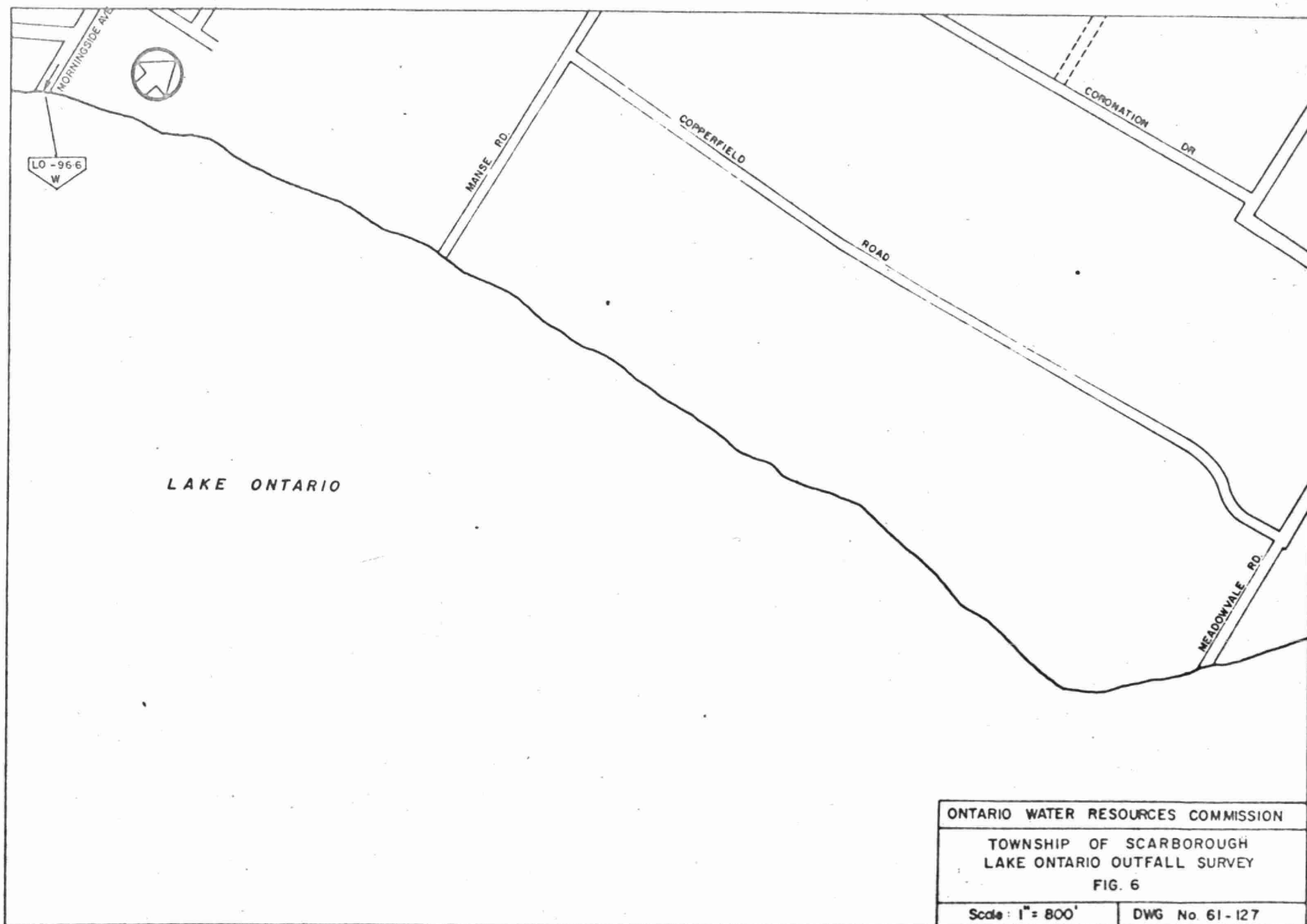
FIG. 4

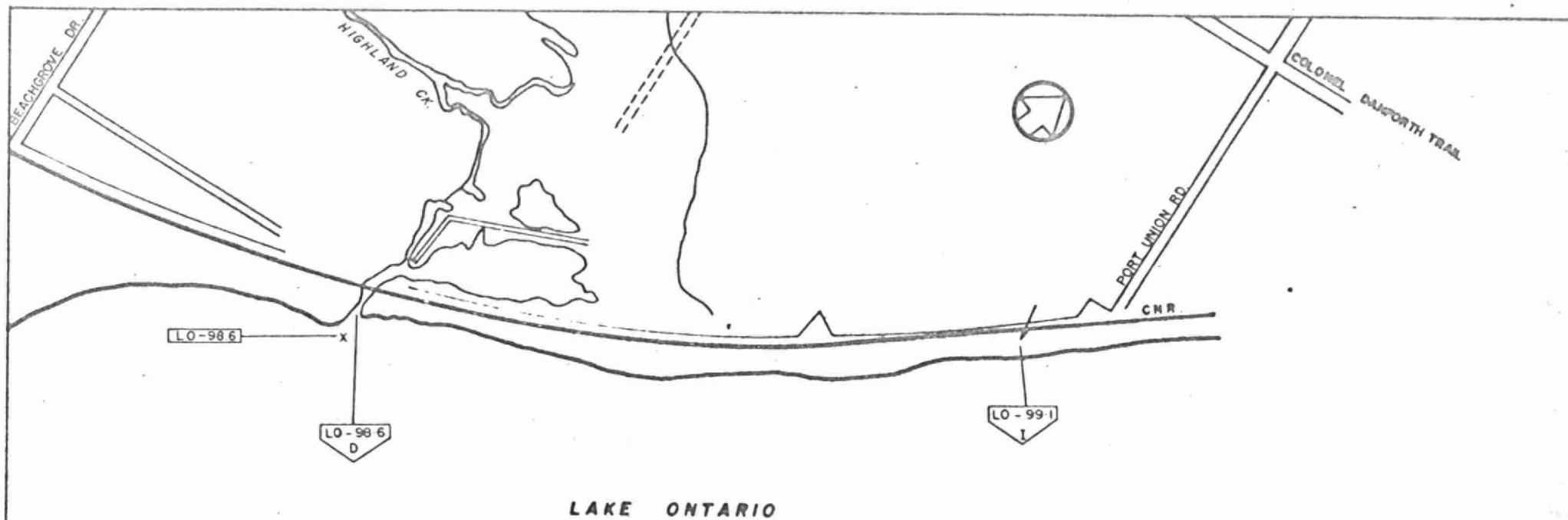
Scale: 1" = 800'

DWG No 61-125









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LAKE ONTARIO OUTFALL SURVEY

FIG. 7

Scale: 1" = 800'

DWG. No 61-136

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